

Fujitsu's Plan for Targeting INTARFRM Application Framework at Individual Developers

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Today's uncertain economic conditions are forcing companies to change the way they do business. A significant change is the increasing use of cloud computing. Moreover, applications have become consumer products thanks to the rapid consumer adoption of portable terminals typified by the smartphone. In line with these trends, Fujitsu's "INTARFRM" application framework, which currently contributes to the development of medium- to large-scale information and communications technology (ICT) enterprise systems, is well positioned for contributing to the efforts of "individual developers." Fujitsu has developed a plan for targeting INTARFRM at individual software developers, such as computer science students and freelance software developers, and for providing a service that combines a customized version of INTARFRM for such users with an Internet-accessible cloud-type development center. Furthermore, by adding new service concepts not found in existing system integration (SI) business practices to this "contribution plan," Fujitsu can develop a new INTARFRM business model that provides benefits for the user and differentiates Fujitsu from its competitors.

1. Introduction

INTARFRM is an application framework supporting medium- to large-scale information and communications technology (ICT) systems from the design phase through the maintenance phase. In addition to standardizing application structures and automatically generating on average more than 60% of an application's source code excluding unique business logic, INTARFRM standardizes design documentation and processes. This framework can therefore shorten development time while also enhancing quality. Furthermore, as an application framework product, INTARFRM can absorb future changes in hardware and operating systems (OSs) on behalf of applications, enabling the applications to grow as they were originally designed without having to be completely rebuilt, as depicted in **Figure 1**.

This paper describes the background leading

to the idea of the INTARFRM business model and our plan for targeting INTARFRM at individual developers as a seed for future business.

2. Analysis of business environment

2.1 Changes in SI business model

In Japan, the traditional way of doing business has been to "scratch the customer's itch" by offering carefully prepared, customer-specific services.

The same has held true for the system integration (SI) business in which start-from-scratch type of development has been performed to meet all of the customer's needs. It has consequently become the norm to create any type of system in a made-to-order manner, to pursue convenience, and to strive for differentiation from other companies in the same industry.

However, in today's unstable economic

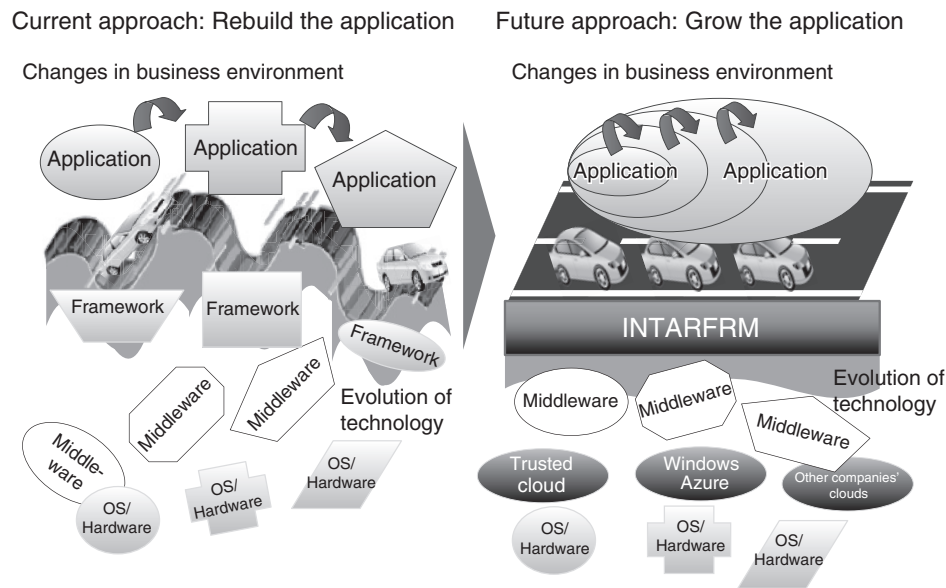


Figure 1
 Conceptual diagram of INTARFRM—how INTARFRM enables applications to grow independently of infrastructure changes.

climate, business conditions are undergoing dramatic changes, and companies are finding it necessary to take appropriate measures.

- Reduce the risk of lost business opportunities (i.e., shorten product delivery time)
- Improve return on investment (i.e., take a “no-asset” approach)

Thus, to improve return on ICT investment, companies will find it important from here on to consider a hybrid configuration—the combination of the best use of highly specialized existing applications developed through heavy investment for mission critical systems and the effective utilization of “cloud” technology for the latest ICT systems for new businesses. This new SI business model can be characterized as a “balance between function-focused and cost-focused systems,” as depicted in **Figure 2**.

To be more specific, function-focused existing business systems can be supported by conventional hands-on, start-from-scratch development and cost-focused systems can be supported by existing products (which will shorten product delivery times) and a cloud

environment (which is a leased infrastructure consisting of servers, OSs, applications, etc.) that can be released when no longer needed (which will eliminate the need to purchase new assets).

Using existing products and a cloud environment however can cause inconvenience and problems due to their limitations. Whether an existing products/cloud approach should be taken depends on the features of the business system and its scope of use.

From another viewpoint, it is becoming increasingly important for cloud-oriented vendors to provide only what their users want to use.

2.2 Evolution of system infrastructure

We next examine the evolution of system infrastructure using as an example smartphones (high-end mobile phones)—which are fast becoming an essential tool for corporate use—and the associated network infrastructures.

When computers and computerized systems first came on the scene, their use was generally limited to office environments, and the business applications that ran on them were all developed

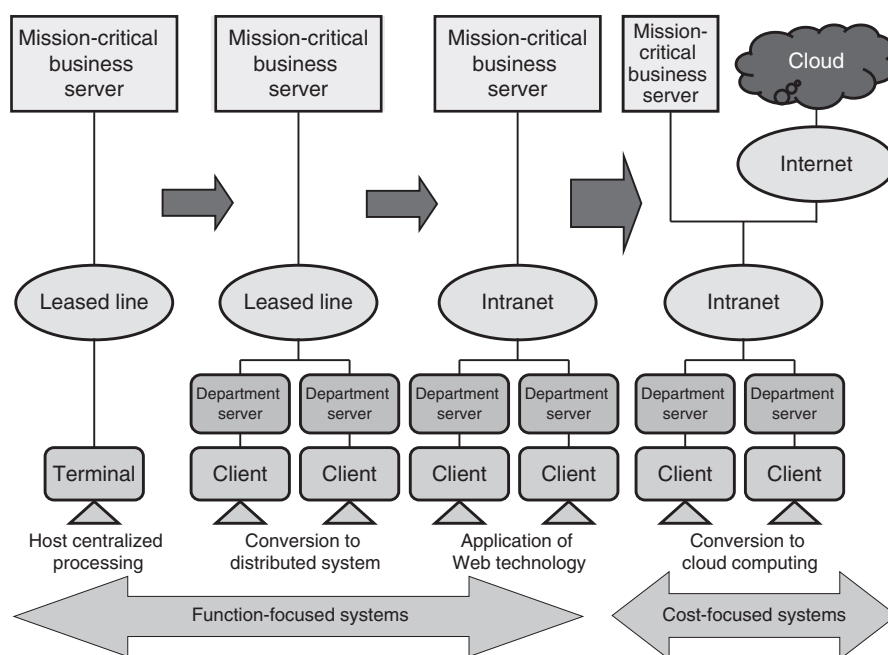


Figure 2
Balance between function-focused and cost-focused systems.

from scratch. This was followed by the era of the personal computer (PC), marked by increasingly convenient computer processing and the explosive growth of individual (home) computing. Data transfer over networks and public telephone lines and the coming of the Internet also helped to make computing a familiar activity for many people.

As a result, people began to feel that the use of business applications should not be limited to specific locations. Although they spent most of their time at their office and home, where they could easily use a variety of applications, the increasing convenience of computers led to increasing demands. For example, more and more people wanted to use business applications even while en route from one point to another. Portable computers like smartphones now meet this demand.

It can therefore be said that the evolution of hardware and networks has promoted the free use of business applications wherever the user and whatever the time may be, thereby

eliminating the original restriction on use to office environments.

2.3 Problems in distribution of business applications

However, there are still barriers that limit the distribution and spread of business applications. One barrier is the need to keep up with new infrastructures that are appearing on the market more and more frequently as a result of competition and then to select the best infrastructure to use for each application. This has created a couple of problems for the consumer.

1) Obsolete infrastructures

One problem is infrastructure obsolescence. The appearance of new infrastructures one after another is a welcome trend from the standpoint of advanced ICT users. However, from the standpoint of consumers who are more than satisfied with infrastructure functions from several generations ago and from that of software developers as well, this trend is not as

welcome. This is because the next-generation infrastructure may appear just as the consumer finally becomes comfortable with the current one or before the software developer has completed product development under the current one. Moreover, by the time the consumer or developer has gotten used to the infrastructure which was new at the time of purchase or start of development, that infrastructure may have already become obsolete. As long as the obsolete product is for a specific infrastructure or from a specific vendor, its compatibility with the new product can usually be maintained.

2) Diversified architectures

Another problem is the diversification of system architectures due to competition. This phenomenon can propagate horizontally if there are a number of competing vendors. As a result, the consumer may take on some risk by selecting one vendor over another.

These two problems pose a real barrier to the open distribution and spread of business applications. Using the above example of more and more people wanting to use business applications even while en route from one point to another, the following sections investigate the effective use of INTARFRM and the contribution

that it can make to satisfying user demands.

3. INTARFRM consumer-oriented contribution plan

3.1 Target

The direction of INTARFRM deployment as visualized by the author is shown in **Figure 3**. The future deployment policy is to promote the use of INTARFRM by customers in a wide variety of fields, and the contribution plan introduced here targets individual and especially junior developers working on products for business or private use. The reason for this is to connect development support with the formation of partnerships through venture-capital investments.

To begin with, developers can be seen as shouldering the future spread of software, and, from the standpoint of vendors, they can help to increase the number of INTARFRM fans. Developers may also find employment in software-related enterprises and become involved in professional development work. If so, there should be many cases in which they become attached to the application-development products to which they have become accustomed. In other words, they may represent the birth of a

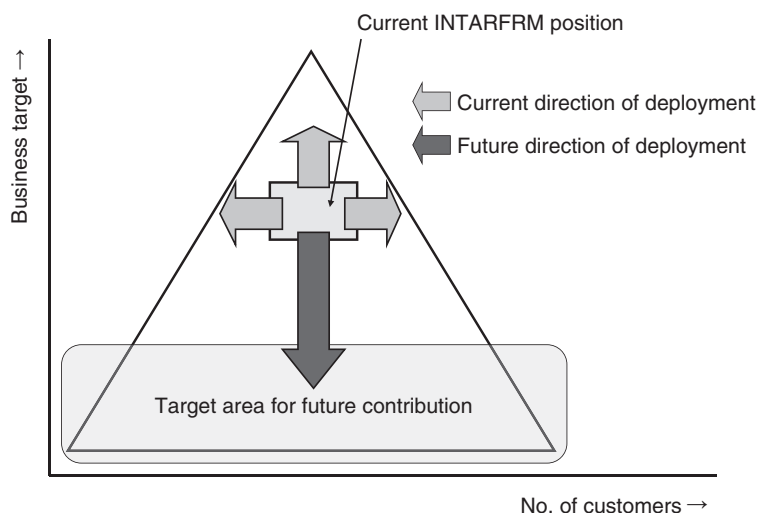


Figure 3
Direction of INTARFRM deployment.

new business opportunity for Fujitsu.

Another reason is that developers have the potential of going independent and starting up their own companies. Today, there are many examples of successful startups that have turned an idea into a great product. Fujitsu believes that becoming indirectly involved from an early stage with such startups by providing venture capital can lead to future profitable partnerships.

3.2 Concerns of target users

When narrowing down its target users to software developers working on products for private or business use, Fujitsu considered that solutions from the vendor side would help alleviate the concerns of such users and that these solutions could be embodied in a user (consumer)-oriented contribution plan. The following discussion examines these concerns in relation to INTARFRM.

1) Obtaining a development environment

A major precondition of software development is obtaining an environment in which the developer can create software products. While it stands to reason that a company would provide an in-house design and development environment for its software developers, obtaining a server or PC, OS, and software for building products is quite a burden for an individual developer. One way that an individual developer can overcome this hurdle is to use an infrastructure that anyone can use freely and easily, like free software.

2) Keeping up with new infrastructures

As with the problems of business-application distribution described in Section 2.3, an individual developer is burdened by the need to keep up with new infrastructures because new infrastructures keep appearing one after another.

3) Getting assurance of a guarantee

The individual developer needs to be guaranteed the ability to respond to and correct any problems that arise in a constructed

environment or with developed software.

INTARFRM can deal with the first concern, “obtaining a development environment,” by providing a cloud-type development center for consumers. It can deal with the other two, “keeping up with new infrastructures” + “getting assurance of a guarantee,” by its application.

3.3 Overview of core provisions

1) Application of INTARFRM (provisional name: INTARFRM Light)

As mentioned before, INTARFRM is an application framework supporting development of medium- to large-scale ICT systems. When considered for use in the consumer market, it may have too much functionality and too high a price. Individual developers, who are the targets of the proposed contribution plan, would like support in relation to these concerns, but they would also not want to see restrictions on those aspects of development in which they want to act freely.

The following five features of today's INTARFRM application framework reflect considerations of general user needs¹⁾:

- Long-term usability
- Anywhere, anytime development
- Operational under a variety of conditions
- Large selection of languages and architectures
- Useable by all

If the features can be narrowed down to those that address the concerns of individual developers (“long-term usability” and “large selection of languages and architectures”), a lower-cost version of INTARFRM, i.e., INTARFRM Light, can be provided.

2) Building a cloud-type development center for consumers

A cloud-type development center is essentially a business (service) that rents out development environments. Such a service has already been launched on a trial basis within Fujitsu. Since the proposed plan is a service

oriented to consumers, it will by necessity be released to an indefinite number of users via the Internet, which means it must overcome the problems described in the following section.

If such a composite service can be provided, a win-win situation should result in which the user benefits from useful and convenient functions and the vendor benefits from expanded business.

3.4 Additional types of business absent in conventional business practices

The previous section introduced the idea of opening up a cloud-type development center to consumers as a specific type of business.

However, as long as this cloud-type development center, which is already providing services, remains basic to this idea, this consumer-oriented business will have difficulty expanding. This is because the users are in a simple give-and-take relationship with Fujitsu in which they pay fees for services rendered, which is no different from past business models. In fact, similar services have already appeared elsewhere, though not from major vendors, and users themselves may not select Fujitsu's service unless conditions from other vendors are unattractive. With this in mind, Fujitsu plans to develop a business model that should appeal to both users and vendors by establishing new service formats not found in conventional business practices to create a basic service framework. This approach can be summarized as follows.

- "Staggered contract business" in which give and take occur at different times
- "Indirect barter business" other than conventional product provision and payment
- "Venture-type support services" toward future development and differentiation

4. Problems and solutions in proposed plan

Problems in the proposed plan, which

targets individual developers, and approaches to solving them are examined below.

4.1 Work-style reform

1) Problem

In the cloud business, users are provided with much flexibility as they may freely begin or terminate use of the cloud. The vendor, however, is subjected to unstable operation revenues. Furthermore, the characteristics of the services provided make it difficult to recover initial expenditures, and, with the current cost structure, running the cloud business can be quite difficult from the viewpoint of revenue. Of particular importance here is the need to reduce sales costs.

2) Solution

One approach to solving this problem is to revamp the work style on the service provider side by moving away from the conventional framework of sales people selling services to targeted clients to a new framework of selling services directly to clients without the involvement of sales people. Such a framework would minimize sales costs. As a result, it would be easier for the service provider to recover initial expenditures and to maintain a balance between revenues and expenditures even for a cloud-type business with its inherent unstable revenues.

4.2 Operation system and security

1) Problem

Given that the proposed contribution plan will have to provide for an indefinite number of users, it will be difficult to make a detailed estimate of demand and to forecast fluctuations in demand. Thus, a major problem in running this consumer business will be how to maintain service levels and the infrastructure needed to provide services. Other problems can also be envisioned, such as system crashes and poor response due to a sudden spike in the number of users and the resulting impact on reputation. There is also the risk of spoofing, information

leaks between users, and other security-related problems.

2) Solution

In addition to setting up a dedicated monitoring system and a call center to provide 24-hour support, creating a user forum to promote communication and mutual support among users is also a good solution.

Meanwhile, a company-wide working group should be established within Fujitsu to create an environment and a firm foundation that promote the rapid and timely application of the latest ICT.

4.3 Standardization toward expanded use of applications

1) Problem

The conventional practice of each vendor placing a priority on its own concerns can alienate users and become an obstacle to the diffusion of applications.

2) Solution

Similar to reforming the work style for selling cloud services, as described in section 4.1, we also need to reconsider the way we design and provide application frameworks. If application framework providers design their frameworks on the basis of their own platform and architecture, as they do now, users are forced to choose an application framework on the basis of their own platform and architecture because it is difficult to change them. They want to and should be able to choose a framework on the basis of the functions they need. Application framework providers need to cooperate and establish a unified platform and architecture, and application frameworks based on them need to be provided so that the application development market can become more user-centric.

4.4 Contract with consumers and protection of intellectual property

1) Problem

To begin actual business operations,

Fujitsu will have to study in detail a variety of requirements in relation to direct sales. These include user identification, user agreement on conditions of use, and the collection of fees. The proposed contribution plan, in addition to providing a development-environment rental business, will enable customers to use Fujitsu products centered on INTARFRM. Contract details also have to be studied from the viewpoint of business practices that depart from conventional ones, such as those mentioned in Section 3.4.

2) Solution

Fujitsu will have to research and closely examine existing Internet businesses like Internet banking and Web-based shopping malls.

4.5 Promotion

1) Problem

For vendors entering the consumer business area, raising awareness in the market is essential to getting a business off the ground. A marketing-type approach is therefore necessary to publicize the business and to regularly and appropriately increase the number of customers.

2) Solution

Fortunately, awareness of Fujitsu in the consumer market is high due to the impact of commercials and other forms of advertising, and this advantage should be energetically pursued. However, on entering the market with the INTARFRM framework as embodied by the proposed contribution plan, it will naturally be necessary for Fujitsu to engage in promotional activities in the early stages.

For example, the service can be introduced at ICT professional schools, and development environments can be initially allocated in units of these schools. Other examples include establishing a campaign/promotion-type system to introduce the service and giving students using the service in a home environment preferential treatment. In other words, Fujitsu could initially promote use from sites of learning.

5. Conclusion

The consumer-oriented contribution plan introduced in this paper will contribute to the satisfaction of user needs and is centered on Fujitsu's INTARFRM application framework. However, to actually stimulate the diffusion and distribution of applications, it is essential that the application framework itself become widely known and diffused. Thus, to make consumers more familiar with this application framework, it may be necessary to accelerate its penetration into the market through individual framework products as a preliminary step.

The current plan, moreover, is not the

ultimate objective. Considering the business environment described in Section 2, Fujitsu considers that a true "contribution" will begin to be made only when many applications incorporating standardized framework products are being developed and distributed independently of the infrastructure.

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